

We Claim:

- 1 1. A thin-film transistor comprising:
2 a glass substrate; and
3 formed at an upper part of said glass substrate, a channel
4 region, a source region, a drain region, a first insulating layer, a
5 second insulating layer and electrodes, wherein:
6 said channel region, said source region and said drain region
7 comprise polycrystalline silicon,
8 said glass substrate comprises an unannealed glass substrate,
9 and
10 said first insulating layer covers said channel region.
- 1 2. The thin-film transistor according to claim 1, wherein said
2 first insulating layer has a layer thickness of 4 nm or larger.
- 1 3. The thin-film transistor according to claim 1, wherein said
2 first insulating layer is a silicon oxide layer formed by oxidizing a
3 surface of said channel region at a temperature of 500°C or below.
- 1 4. The thin-film transistor according to claim 1, wherein said
2 first insulating layer is a silicon oxynitride layer formed by

3 oxynitriding a surface of said channel region at a temperature of
4 500°C or below.

1 5. The thin-film transistor according to claim 1, wherein said
2 second insulating layer is provided at an upper part of said first
3 insulating layer and is formed by chemical deposition.

1 6. The thin-film transistor according to claim 1, wherein said
2 second insulating layer is provided above said first insulating layer
3 and is formed by physical deposition.

1 7. The thin-film transistor according to claim 1, wherein said
2 second insulating layer is provided above said first insulating layer
3 and is formed by spin coating.

1 8. The thin-film transistor according to claim 1, wherein a
2 diffusion preventive layer is formed on the surface of said
3 unannealed glass substrate on its side where said channel region,
4 source region and drain region are formed.

1 9. A thin-film transistor comprising:
2 a glass substrate; and
3 formed at an upper part of said glass substrate, a channel
4 region, a source region, a drain region, an insulating layer and

5 electrodes, wherein:

6 said channel region, said source region and said drain region
7 comprise polycrystalline silicon,

8 said glass substrate comprises an unannealed glass substrate,
9 and

10 said insulating layer covers said channel region.

1 10. The thin-film transistor according to claim 9, wherein said
2 insulating layer is formed at a temperature of 500°C or below.

1 11. The thin-film transistor according to claim 9, wherein said
2 insulating layer is a silicon oxide layer formed by oxidizing a surface
3 of said channel region at a temperature of 500°C or below.

1 12. The thin-film transistor according to claim 9, wherein said
2 insulating layer is a silicon oxynitride layer formed by oxynitriding a
3 surface of said channel region at a temperature of 500°C or below.

1 13. A process of manufacturing a thin-film transistor,
2 comprising the steps of:

3 (1) forming an amorphous silicon layer at an upper part of an
4 unannealed glass substrate;

5 (2) irradiating the amorphous silicon layer by laser light to
6 form a polycrystalline silicon layer;

7 (3) forming a channel region, a source region and a drain
8 region at predetermined positions of the polycrystalline silicon layer;

9 (4) oxidizing a surface of the polycrystalline silicon layer at
10 least at its channel region at a temperature of 500°C or below to form
11 a first insulating layer;

12 (5) forming a second insulating layer on the first insulating
13 layer;

14 (6) forming a gate region on the second insulating layer at its
15 position corresponding to the channel region; and

16 (7) forming an interlaminar insulating layer to cover the gate
17 region, and thereafter forming corresponding electrodes so as to
18 provide their electrical interconnection with the source region, the
19 drain region and the gate region.

1 14. The process of manufacturing a thin-film transistor
2 according to claim 13, wherein, in the step of forming said first
3 insulating layer, said first insulating layer is formed by oxidizing the
4 surface of said polycrystalline silicon layer in an atmosphere
5 containing at least ozone.

1 15. The process of manufacturing a thin-film transistor
2 according to claim 14, wherein said atmosphere comprises ozone
3 and H₂O.

1 16. The process of manufacturing a thin-film transistor
2 according to claim 14, wherein said atmosphere comprises ozone and
3 N₂O.

1 17. The process of manufacturing a thin-film transistor
2 according to claim 13, wherein, in the step of forming said first
3 insulating layer, a first silicon oxide layer is formed at the surface of
4 said polycrystalline silicon layer by an oxygen-donating solution,
5 and thereafter a second silicon oxide layer is formed between the first
6 silicon oxide layer and said polycrystalline silicon layer in an
7 atmosphere containing ozone.

1 18. The process of manufacturing a thin-film transistor
2 according to claim 14, wherein, in the step of forming said first
3 insulating layer, ozone gas or a ozone-containing gas heated to a
4 temperature lower than the temperature at which the ozone is
5 decomposed, is fed to the surface of said polycrystalline silicon layer.

1 19. The process of manufacturing a thin-film transistor
2 according to claim 14, wherein, in the step of forming said first
3 insulating layer, ozone gas or ozone-containing gas heated to a
4 temperature of 150°C or below, is fed to the surface of said
5 polycrystalline silicon layer.

1 20. The process of manufacturing a thin-film transistor
2 according to claim 13, wherein, in the step of forming said first
3 insulating layer, a first silicon oxide layer is formed at the surface of
4 said polycrystalline silicon layer, and thereafter a second silicon
5 oxide layer having a density higher than said first insulating layer is
6 formed between the first silicon oxide layer and said polycrystalline
7 silicon layer.

1 21. The process of manufacturing a thin-film transistor
2 according to claim 17, wherein said first silicon oxide layer has a
3 layer thickness from 0.1 nm to 1 nm.